Metcalf Energy Center

January 18, 2005

Steve Munro
Compliance Project Manager
Systems Assessment & Facility Siting Division
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814

Re: Metcalf Energy Center (99-AFC-3C), Amendment to Air Compliance Conditions
Response to Data Request

Dear Mr. Munro:

This letter responds to a January 5, 2005 Data Request received from the California Energy Commission. The Data Requests are related to Metcalf Energy Center, LLC's petition to amend the Conditions of Certification related to minor modifications of the air permit from the Bay Area Air Quality Management District (District).

Attached are the Data Requests received from the CEC. MEC's responses are inserted in italics immediately after each of the various Data Requests.

Also attached, and listed below, are various supporting data, which are referenced in MEC's Response to CEC Data Request.

If you have any questions, please contact me at 408 361-4805.

Sincerely,

Mark Smolley

Mark Smolley
Compliance Manager

Enclosures: Response to CEC Data Request – January 18, 2005
Attachment 1 – Ammonia Slip Calculation
Attachment 2 – Modeled Impacts during Turbine Commissioning
Table 1 – Sutter Energy Center – Startup Emissions Data
Table 2 – Sutter Energy Center – Shutdown Emissions Data
Diskette with Revised Modeling Data

cc: without Diskette
Barbara McBride, Calpine
Bob McCaffrey, Calpine
Jeff Harris, Ellison Schneider & Harris

1 BLANCHARD ROAD · P.O. BOX 13190 · SAN JOSE, CA 95013 · PHONE (408) 361 4800 · FAX (408) 463 6077 · www.metcalfenergycenter.com

MEC RESPONSE TO CEC DATA REQUEST
AIR QUALITY

INTRODUCTION

Metcalf Energy Center, LLC (MEC-LLC) submitted a petition to amend the Conditions of Certification for the Metcalf Energy Center (MEC). These amendments include the allowance for periodic combustor replacement and subsequent tuning, an increase in the allowable startup time (from two hours to six hours), a decrease in the length of commissioning operational hours (from 300 hours to 50 hours) and several changes to emission limits during startup and commissioning. CEC Staff is currently reviewing the petition and air dispersion modeling provided. CEC Staff submitted these initial data requests to clarify the following issues. *MEC LLC's responses are presented in italics and follow each of the data requests.*

ISSUES AND DATA REQUESTS

INCREASED CO EMISSIONS DURING COMMISSIONING

Background

MEC-LLC has requested that the carbon monoxide (CO) emission limits during commissioning be increased from 930 lbs/hour to 5,000 lbs/hour. In the discussion for the necessity of this requested increase, MEC-LLC sites the "experience of other large gas turbine facilities in commissioning their turbines." Staff is unfamiliar with any commissioning experience that would lead staff to the same conclusions as MEC-LLC. Therefore, staff asks that MEC-LLC clarify their statement by adequately responding to Data Request-1.

Data Request

1. Please submit all relevant monitoring data including, but not limited to, fuel use, CEMS (particularly CO) data and emission factors (and their derivation), that MEC-LLC referred to in their petition to amend as "the experience of other large gas turbine facilities in commissioning their combustion equipment."

Response: MEC, LLC objects to this Data Request because, without admitting that the information requested is relevant, to the extent that such information is reasonably available to the MEC, LLC and the MEC, LLC alone, such information has been already provided in compliance filings made with the Commission in other proceedings. MEC, LLC further objects to this request as irrelevant.

Without waiving any of these objections, MEC, LLC reserves the right, but has absolutely no obligation, to provide responses, in whole or in part, to some, all or none of this Data Requests to which MEC, LLC objects. Consistent with the foregoing, MEC, LLC, provides the following response:

MEC, LLC made this request to allow for elevated CO emissions during the commissioning activities that will take place prior to the installation of the oxidation catalyst or during periods where cold plant conditions will result in a delay in the effectiveness of the oxidation catalyst until it reaches its design operating temperature. MEC, LLC intends to limit these operations to those required for pre-parallel demonstrations required by the utility interconnection standards and limited load operations following these checks.

DECREASED OPERATION TIME DURING COMMISSIONING

Background

MEC-LLC has petitioned the Commission to lower the number of hours during which the MEC turbines may operate without abatement (SCR and oxidation catalyst emission controls) from 300 to 50 hours. MEC-LLC states that this is also a reflection of experience from commissioning other large turbine facilities. While staff does not doubt that MEC-LLC can complete the installation of the SCR and oxidation catalyst within 50 operational hours of the start of commissioning, tuning and balancing the emission controls may take far more time. It is staff's experience that project owners need (and petition for) more time during commissioning for large turbine facilities, not less. Therefore, staff asks that MEC-LLC clarify their request by adequately responding to Data Requests-2 through 5.

Data Request

2. Please provide a detailed revised initial commissioning schedule that specifically identifies each component test protocol and how those test protocols differ from the originally proposed initial commissioning test schedule.

3. Please submit all relevant information that leads MEC-LLC to conclude that all combustion equipment and steam side components can be properly tested and adjusted within the first 50 operational hours before installation of the SCR and oxidation catalyst emission control systems.

4. Please submit a letter from manufacturer(s) of all components (such as the gas and steam turbines, HRSGs, etc.) that they understand the proposed initial commissioning schedule and they agree that such a schedule will not cause damage to their components nor void their component warrantees.

5. Please provide, based on the information provided in Data Requests-2 and -3, a NOx emission estimate for each major milestone during the commissioning procedure, beginning with first-fire and ending with final CEMS confirmation.

Response: MEC, LLC objects to Data Requests 2, 3, 4, and 5 because the information requested is irrelevant to the requested amendment and is not reasonably necessary to make any decision on the amendment. Further, MEC, LLC further objects specifically to Data Request 4 because to the extent that the request is seeking commercial

guarantees, vendor quotes, actual costs, and estimated costs, and without admitting that the requested information is relevant, MEC, LLC objects on the basis that the information requested contains confidential and proprietary business information or other trade secrets that are not relevant to the Commission's environmental review of the project.

Due to the objections cited above, MEC, LLC is withdrawing the request to modify the maximum allowable operating hours from 300 hours to 50 hours without installation of catalytic controls. Since MEC, LLC is withdrawing the request to modify the maximum allowable operating hours, we are not submitting any additional information to respond to Data Request items 2 through 5.

AMMONIA SLIP FORMULA

Background

MEC-LLC is proposing to modify Condition of Certification AQ-20 (e) to a more simplified requirement that depends on "a District approved ammonia slip calculation." However, that calculation is not discussed or presented in any form. Staff has, on other recent amendments, found that the District calculation methodology was severely lacking in enforceability to such an extent that staff was required to develop a separate more enforceable methodology. Therefore, staff requests that MEC-LLC adequately respond to Data Request-6.

Data Request

6 Please provide the District policy for enforcement of the ammonia slip limit, the ammonia slip calculation formula and methodology approved by the District including, but not limited to, the timing and location of all necessary flue gas sampling and ammonia injection rate sampling, and required source testing.

Response: MEC, LLC objects to this Data Request because, without admitting that the information requested is relevant, to the extent that such information is reasonably available to the MEC, LLC and the MEC, LLC alone, such information has been already provided to the staff in compliance filings made with the Commission. MEC, LLC further objects to this request as argumentative and irrelevant. Without waiving any of these objections, MEC, LLC reserves the right, but has absolutely no obligation, to provide responses, in whole or in part, to some, all or none of this Data Requests to which MEC, LLC objects. Consistent with the foregoing, MEC, LLC, provides the following response:

The ammonia slip limit will be enforced based on the procedure approved by the District for other, similar facilities. The ammonia slip will be calculated on a rolling 3-hour average basis as required by Condition #20(e) of the ATC. The calculation used to determine the ammonia slip is included as Attachment 1. This calculation uses the ammonia injection rate, the NOx concentration prior to the SCR catalyst, the stack NOx concentration, and source test results to calculate an ammonia slip value in parts per million. Source tests results conducted over the expected operating range of the turbine

will be used to develop the correction factor included in the calculation. The calculated slip value will be continuously recorded on a rolling 3-hour average basis. An exceedance of permit condition # 20 would be reported to the District, as required, if the calculated slip value exceeds 5 ppm on a rolling 3-hour average basis.

DAILY LIMIT INTEGRITY

Background

MEC-LLC is proposing new emission limits for "combustor tuning" wherein worn combustors are periodically replaced and the turbine is subsequently re-turned. Emission limits are proposed for combustor tuning events for the emissions of NOx, CO and Precursor Organic Compounds (POC). Given the standard procedures for combustor tuning that staff is aware of, the MEC might exceed its daily emission limits for NOx, CO and POC while complying with its combustor tuning limits, startup limits and operational limits under the current MEC-LLC proposal. While NOx and CO are monitored in stack, thus giving the operator ample warning to avoid violating those daily limits, POC is not. POC is verified once a year through source testing, for normal operation. POC emissions during startup and combustor tuning events are not typically source tested. Therefore, it is possible for MEC to exceed the POC daily limit unbeknownst to the operator, or anyone else. There are solutions for this situation, but further information will be necessary. Therefore, staff requests MEC-LLC to adequately respond to Data Request-7 through -9.

Data Request

7 Please explicitly identify all combustor tuning procedures and corresponding emission amounts during a 6-hour combustor-tuning event that may emit NOx, CO and POC.

Response: Tuning of combustion turbines is required to maintain proper combustion dynamic levels and to meet guaranteed emission levels. There are several reasons why combustion tuning may be required; these include, but are not limited to, initial combustion system commissioning, combustion hardware replacement, seasonal ambient changes, and changed operating parameters that would dictate re-tuning. After initial commissioning, the units will need to be tuned at various times. The turbine manufacturer, Siemens/Westinghouse, generally makes a conservative recommendation that combustor tuning be performed after every combustion inspection (CI); this typically occurs once a year. Tuning may also be called for during the year, between CI's. Combustion dynamics are an indication of the stability of combustion, which if left uncorrected, can destroy engine components.

Siemens/Westinghouse provided MEC a proprietary guidance document entitled "Tuning of the Dry Low NOx Combustor System". This guidance document indicates that tuning is conducted over various load points. Although it can be conducted during a routine startup lasting about three hours, this is not efficient and can actually cause more emissions (due to the need to shut down and restart before the startup window has elapsed) than if it had been conducted during a continuous 4-6 hour period. The

SW guidance document indicates that tuning is done throughout various load conditions; this may require ramping the engine down and up several times throughout the tuning process. The emissions during this period of time will be similar to that of a startup; which is why MEC, LLC is requesting twice the startup limit (on a pounds per event basis) for a 6 hour tuning event. The emissions during an actual tuning event will depend on the purpose of the tuning, the load the tuning is to be conducted at, and the duration of the tuning. However, in all cases emissions during combustor tuning will be at or below the limits requested.

Emissions of CO and NOx will be monitored during each tuning event so the emissions will be well documented. Emissions for POC will not be monitored continuously, but since the emissions will be similar to those during startup, the emission factor developed during the POC startup period required by the conditions will be used to estimate the emissions during a tuning event.

8 Please discuss the proposed daily operation and corresponding emissions of the MEC facility for the presumed worst-case scenario to justify the daily emission limits. The most reasonable worst-case daily operation should include, but is not limited to a combustor-tuning event and maximum operation at 100% load with the duct burners on.

Response: MEC, LLC objects to this Data Request because the information requested is irrelevant to the requested amendment and is not reasonably necessary to make any decision on the amendment. Further, MEC, LLC objects to the Data Request as burdensome and argumentative in that what is described as a reasonable worst-case scenario includes certain assumptions that are not reasonable.

Without waiving any of these objections, MEC, LLC reserves the right, but has absolutely no obligation, to provide responses, in whole or in part, to some, all or none of this Data Request to which MEC, LLC objects. Consistent with the foregoing, MEC, LLC, provides the following response:

MEC, LLC is preparing this response and it will be submitted at a later date.

9 Please discuss the procedure or source testing protocol by which the POC emissions during a startup event and a combustor-tuning event can be verified.

Response: The procedure for source testing at MEC was submitted to the CEC on January 17, 2005 (Source Test Plan for MEC, The Avogadro Group, LLC, December 22, 2004). The test method is identical to the test method used at Sutter Energy Center in October 2003, where the source testers continuously analyzed for total hydrocarbons, methane and ethane. The Source Test Plan gives more details on the testing.

ANNUAL LIMIT AND OFFSET INTEGRITY

Background

Making some simple assumption regarding the facility operation, staff found that the annual NOx emission limit might be violated while complying with the combustor tuning, startup, shutdown and normal operation emission limits. Staff finds that it would be unlikely that the MEC would exceed the annual NOx emission limit given that NOx emissions are monitored by the CEMs. However, since the short-term emission limits are being revised, staff needs to be sure that the current annual limits are still appropriate and can still be met. Therefore, staff requests the MEC-LLC adequately respond to Data Request-10.

Data Request

10 Please provide all operational assumptions and corresponding emission calculations to show that the MEC facility emissions of NOx, CO, POC, SOx and PM10 will remain under the current annual emission limits.

Response: MEC, LLC objects to this Data Request because the information requested is irrelevant to the requested amendment and is not reasonably necessary to make any decision on the amendment. Further, MEC, LLC objects to the Data Request as burdensome and argumentative to the extent that it requests "all" operating assumptions, including certain assumptions that are not reasonable.

Without waiving any of these objections, MEC, LLC reserves the right, but has absolutely no obligation, to provide responses, in whole or in part, to some, all or none of this Data Request to which MEC, LLC objects. Consistent with the foregoing, MEC, LLC, provides the following response:

MEC, LLC is preparing this response and it will be submitted at a later date.

PSD SIGNIFICANCE THRESHOLD

Background

On page 10 of Appendix A, the application to the Bay Area Air Quality Management District, MEC-LLC compares the maximum-modeled impact of the proposed changes to the PSD Significance threshold. The results show that the proposed modifications clearly exceed the NO2 1-hour threshold and CO 1-hour and 8-hour threshold of BAAQMD Rule 2-2-233. However, MEC-LLC does not discuss the ramifications of exceeding those significance thresholds nor how they will comply with PSD requirements of the BAAQMD Rules and Regulations. Therefore, staff asks MEC-LLC to clarify their position on this matter by adequately responding to Data Request-11.

Data Request

11 Please discuss how exceeding the significance thresholds of Table 11 of the amendment request does not require additional PSD analysis including ambient air quality monitoring as required in Rule 2-2-414.3.

Response: This issue was addressed in an e-mail to the BAAQMD on Dec. 23, 2004, and in a submission to the CEC on January 7, 2005.

COLD STARTUP DEFINITION

Background

MEC-LLC is proposing to add a definition for "Gas Turbine Cold Startup Period:" in the Conditions of Certification, Definitions section. The definition restricts cold startup to 360 minutes beginning with the initiation of fuel flow to the gas turbine as the beginning and ending when the gas turbine achieves two consecutive CEM data points in compliance with the emission concentration limits. Staff finds there is a difficulty with this definition concerning the term "CEM data points." The CEM will "poll" the various sensors within its system approximately every 15 seconds. These 15-second data points are typically averaged or summed (depending on the control system) into 15-minute and eventually 1-hour data points. The referenced emission limit within the definition proposed by MEC-LLC is the NOx 1-hour average limit of 2.5 ppm at 15 percent O2. Thus, it is difficult for staff to determine what "CEM data points" means. Therefore, staff requests the MEC-LLC adequately respond to Data Request-13.

Data Request

12 Please refine the definition of "Gas Turbine Cold Startup Period" such that it can be easily determined and verified.

Response: The definition of Gas Turbine Cold Startup Period is consistent with the current Gas Turbine Start-Up Mode definition, which is as follows: The lesser of the first 360 minutes of continuous fuel flow to the Gas Turbine after fuel flow is initiated or the period of time from Gas Turbine fuel flow initiation until the Gas Turbine achieves two consecutive one-minute CEMS data points in compliance with the emission concentration limits of condition 20(b), following a shutdown of at least 72 hours.

COMBUSTOR TUNING RECOMMENDATION

Background

In the definition for "Combustor Tuning Activities:" MEC-LLC defines these activities as those that are recommended by the turbine manufacturer to ensure the safe and reliable operation of the gas turbine following a combustor replacement. Since combustor-tuning activities have not been well defined in the amendment request, staff requests further information regarding the manufacturer's stated recommendations. Therefore, staff requests that MEC-LLC adequately respond to Data Request-13.

Data Request

13 Please submit all turbine manufacturer recommendations, procedures and protocols regarding the initial and subsequent tuning requirements for the MEC gas turbines.

Response: MEC, LLC objects to this Data Request because, without admitting that the information requested is relevant, to the extent that such information is reasonably available to the MEC, LLC and the MEC, LLC alone, such information has been already provided in compliance filings made with the Commission for other Calpine projects. MEC, LLC further objects to this request as irrelevant. Further, MEC, LLC further objects because to the extent that the request is seeking commercial guarantees, vendor quotes, actual costs, and estimated costs, and without admitting that the requested information is relevant, MEC, LLC objects on the basis that the information requested contains confidential and proprietary business information or other trade secrets that are not relevant to the Commission's environmental review of the project.

Without waiving any of these objections, MEC, LLC reserves the right, but has absolutely no obligation, to provide responses, in whole or in part, to some, all or none of this Data Requests to which MEC, LLC objects. Consistent with the foregoing, MEC, LLC, provides the following response:

The information requested in Data Request 13 is contained in the response to Data Request number 7 above.

COMBUSTOR TUNING PERIOD DEFINITION

Background

The definition that MEC-LLC proposed for the combustor-tuning period is insufficient to define the period. There is no beginning defined and no end defined. It is staff's opinion that, under this definition, adequate tuning could not take place, nor can an enforceable permit condition be crafted that can apply to combustor-tuning episodes. Therefore, staff requests that MEC-LLC adequately respond to Data Requests-14 and –15.

Data Requests

14 Please provide a definition of the beginning of combustor tuning that is coincidental with the initiation of fuel into the newly replaced combustor or other suitable event.

Response: Combustor tuning can be conducted in conjunction with a startup, or it can be initiated from base load operations. If tuning is conducted in conjunction with a startup, the beginning of the combustor-tuning period would be the initiation of fuel flow. If the combustor tuning is conducted from base load operations, the beginning of the combustor-tuning event would be the time period associated with the reduction in load when the first permit limit is exceeded.

15 Please provide a definition of the end of combustor tuning that is coincidental with the recommendations of the gas turbine manufacturers.

Response: The combustor-tuning period would end when compliance with both the NOx and CO emission limits was restored, or 6 hours after initiation of the combustor-tuning period, which ever is sooner.

DELETION OF STARTUP HOURLY EMISSION LIMIT

Background

MEC-LLC is proposing to delete the hourly startup emission limits, stating that they are overly restrictive in some cases. It is the intention of emission limits to be restrictive, even overly restrictive, in support of the Commission Decision. Therefore, the restrictive nature of an emission limit cannot be used as the sole rational for its deletion. MEC-LLC has indicated that changes to other emission limits are a result of their experience with the Delta Energy Center and the Los Madenos Energy Center. Data from these power plant facilities showing a consistent violation of the emission limits proposed for MEC could be used to justify deleting the hourly startup emission limits. Therefore, staff requests that MEC-LLC adequately respond to Data Requests-16

Data Request

16 Please provide all CEMS data for NOx and CO emission, all relevant data recorded for POC emissions, and any other relevant emission recordings for all startups at the Delta Energy Center and Los Madenos Energy Center that supports the proposed deletion of the hourly startup emission limits for MEC.

Response: MEC, LLC objects to this Data Request because, without admitting that the information requested is relevant, to the extent that such information is reasonably available to the MEC, LLC and the MEC, LLC alone, such information has been already provided in compliance filings made with the Commission. MEC, LLC further objects to this request as irrelevant.

Without waiving any of these objections, MEC, LLC reserves the right, but has absolutely no obligation, to provide responses, in whole or in part, to some, all or none of this Data Requests to which MEC, LLC objects. Consistent with the foregoing, MEC, LLC, provides the following response:

The elimination of the hourly emission limits during startup is proposed to make the MEC permit consistent with other permits that have been approved by the CEC and BAAQMD. Specifically, the Delta Energy Center and the Los Medanos Energy Center permits do not have hourly emissions limits that apply to routine startups. In addition, the Sutter Energy Center has NOx emissions limits that are double the hourly limits proposed for MEC and Sutter has CO emissions limits that are based on a rolling 3-hour average during startup.

The only Calpine plant that is similar in design to MEC in California is the Sutter Energy Center because it uses the same Siemens/Westinghouse combustion turbine technology and has a CO catalyst. The attached Table 1 lists data from startups at

Sutter that support elimination of the hourly limit. As you can see there are several hours for both CO and NOx where the hourly emissions at Sutter exceed the current limits in the MEC permit.

AMBIENT AIR QUALITY MONITORING

Background

MEC-LLC is currently monitoring the ambient air quality near the MEC project site. However, MEC-LLC has been activity monitoring for only a short while, approximately early November. The background ambient air quality being used in the petition is from the San Jose area and may not represent the MEC project site. There is clearly too little monitoring data available from the MEC project site to be used to represent the area ambient air quality. However, it is important to scrutinize what local monitoring data is available to ensure that the representative ambient air quality data is reasonable. Therefore, staff requests that MEC-LLC adequately respond to Data Request-17.

Data Request

17 Please provide all available ambient air quality monitoring data from the MEC project vicinity in raw format for all available pollutants including, but not limited to CO, NO_2 and PM10.

Response: MEC, LLC objects to this request as argumentative, irrelevant, and redundant because the Commission Decision in this case determined that the air quality monitoring data used in the certification proceeding is representative of the MEC project site, and the monitoring data used to support the amendment is consistent with that previously approved by the Commission. MEC, LLC further objects to this request as burdensome.

ADDITIONAL AIR DISPERSION MODELING

Background

MEC-LLC has provided substantial air dispersion modeling for the requested emission limits in the petition. The modeling of CO emissions during commissioning assumed that both turbines would be emitting half of the proposed hourly emission limit of 5,000 lbs/hour. This proposed CO emission limit is intended to restrict the total emissions from both exhaust stacks. Thus a likely commissioning scenario is that both turbines are in commissioning at the same time and use up the maximum allotted limit. However, what is also allowable under the proposed CO emission limit is that one turbine can be in commissioning while the other is off-line and the maximum allotted limit is used. While this scenario is unlikely, since it is permissible under the proposed CO emission limits and may produce slightly different impacts on the ambient air quality. Therefore, staff requests that MEC-LLC adequately respond to Data Request-18.

Data Request

18 Please provide air dispersion modeling for CO emissions (both 1-hour and 8-hour) during commissioning, representing one turbine and HRSG in operation at the maximum proposed limit (5,000 lbs/hour for the 1-hour standard and 20,000 lbs for the 8-hour standard) while the other turbine and HRSG is not operating and thus not emitting.

Response: MEC, LLC has prepared the requested air dispersion modeling analysis. The results are summarized in the following table:

Summary of Supplemental Modeling Results CO Impacts During Commissioning of One Turbine						
Pollutant	Avg Prd	Max. Modeled Concentration, ug/m^3	Background Concentration, ug/m^3	Total Concentration, ug/m^3	State Standard, ug/m^3	Federal Standard, ug/m^3
CO	1-hr	11,106[a]	11,125	22,231	23,000	40,000
	8-hr	1,926	7,811	9,737	10,000	10,000
Note: a. Impact shown reflects unit designated "Turbine 2" operating alone. Impact from unit designated "Turbine 1" operating alone is 10,769 ug/m^3.						

In preparing the response to this data request, MEC, LLC determined that the emission rates used in the original analysis of 8-hour average CO impacts during commissioning were in error and that the receptor grid needed to be extended to capture the maximum one-hour average impacts. The corrected results are provided in the following table:

Summary of Supplemental Modeling Results CO Impacts During Commissioning of Two Turbines (Revised)						
Pollutant	Avg Prd	Max. Modeled Concentration, ug/m^3	Background Concentration, ug/m^3	Total Concentration, ug/m^3	State Standard, ug/m^3	Federal Standard, ug/m^3
CO	1-hr	*10,938*	11,125	*22,063*	23,000	40,000
	8-hr	*1,944*	7,811	*9,755*	10,000	10,000

The modeling input and output files are provided on the enclosed diskette. The emission rates and stack parameters used for the modeling analyses will be provided in Attachment 2.

INCREASED EMISSION LIMITS FOR SHUTDOWN

Background

MEC-LLC is proposing to increase the shutdown emission limits for NOx, CO and POC substantially, siting their experience at other similar power plants. However, these emission limits appear to be similar to only the Delta Energy Center and not the Los Medanos Energy Center shutdown emission limits. Therefore, staff requests that MEC-LLC clarify their proposal by adequately respond to Data Request-19.

Data Request

19 a. Please provide all CEMS data (for NOx and CO), all relevant POC emissions data recorded or other relevant data recordings during all shutdown events at both the Delta Energy Center and the Los Medanos Energy Center that support the shutdown emission limit increases proposed by MEC-LLC.

Response: MEC, LLC objects to this Data Request because, without admitting that the information requested is relevant, to the extent that such information is reasonably available to the MEC, LLC and the MEC, LLC alone, such information has been already provided in compliance filings made with the Commission for DEC and LMEC. MEC, LLC further objects to this request as irrelevant and burdensome.

Without waiving any of these objections, MEC, LLC reserves the right, but has absolutely no obligation, to provide responses, in whole or in part, to some, all or none of this Data Requests to which MEC, LLC objects.

19 b. If the data requested in 19(a) is not available, please justify the proposed shutdown emission limit increases with whatever data and rationale is available.

Response: The shutdown emission limits proposed for MEC are consistent with other plants previously approved by the CEC. The emission limits also make the shutdown limits consistent with the startup limits for ease of compliance. As shown in Table 2, there are several shutdowns from the Sutter Energy Center, which exceeded the shutdown emission limits contained in the MEC permit. As indicated above, the Sutter Energy Center is the only Calpine plant with a configuration similar to that of MEC.

COMBUSTOR TUNING EMISSION LIMITS

Background

MEC-LLC is proposing NOx, CO and POC emission limits for a combustor-tuning event (limited to 6 hours in duration) based on the current emission limits for a normal startup (limited to 3 hours in duration). Thus, the proposed emission limits for a combustor-tuning event are exactly double those of the normal startup event. However, as MEC-LLC has stated for other emission limit increases, they have extensive experience at similar power plant facilities. Specifically, MEC-LLC cites the Delta Energy Center and the Los Madenos Energy Center as their source of experience. Therefore, staff requests that MEC-LLC justify their proposal by adequately respond to Data Request-20.

Data Request

20 Please provide all CEMS data for NOx and CO, all relevant data recorded for POC emissions, and any other relevant emission recordings for all cold startups or combustor-tuning events at the Delta Energy Center and Los Madenos Energy Center that supports the proposed emission limits for MEC.

Response: MEC, LLC objects to this Data Request because, without admitting that the information requested is relevant, to the extent that such information is reasonably

available to the MEC, LLC and the MEC, LLC alone, such information has been already provided in compliance filings made with the Commission by DEC and LMEC. MEC, LLC further objects to this request as irrelevant.

Without waiving any of these objections, MEC, LLC reserves the right, but has absolutely no obligation, to provide responses, in whole or in part, to some, all or none of this Data Requests to which MEC, LLC objects. Consistent with the foregoing, MEC, LLC, provides the following response:

The cold startup limits proposed in the MEC permit are based on experience at other plants, which indicate that a cold steam turbine startup can last up to six hours. When the steam turbine is cold it takes extra time to get the steam pressure and temperature correct so that the steam turbine load (and hence gas turbine load) can be increased. To meet the manufacturer's recommendation for a steam turbine cold start, it may take up to six hours. The limits proposed in the MEC permit are simply taking the limit for a 3-hour start and doubling them to account for a possible 6-hour start. The same logic was used for the 6-hour tuning events. Since cold start and combustor tuning events are limited to 30 hours per year, the impact on annual emissions is minimal.

Attachment 1
Ammonia Slip Calculation

Ammonia Slip Calculation:

NH3 slip (ppmvd @ 15% O2) = ((NH3 fed ppm - (NOx in ppm - NOx out ppm)) * ((20.9-15)/(20.9-O2))) * b

Where:

NH3 fed in ppm = ((NH3 injection rate, lb/hr * a) / (Q * Fd * 4.4096×10^{-8})) * ((20.9 - O2 %)/20.9)

4.4096×10^{-8} = (K-factor constant) corrects for the molecular weight of ammonia.

a = Ammonia Concentration (in % by wgt/100)

b = Correction Factor based on source test data

Q = Fuel Flow mmbtu/hr

Fd = 8710 scf/mmbtu

Note:

(1) Since LMEC does not have an inlet NOx analyzer, each time source testing is conducted, testing at the inlet to theSCR catalyst will be conducted and that number used for the inlet NOx concentration.

Attachment 2

Metcalf Energy Center
Modeled Impacts During Turbine Commissioning
Assume one turbine in commissioning

	Stack Diam, m	Stack Height, m	Exh Temp, Deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Emission Rates, g/s	
						CO 1-hr	CO 8-hr
Turbine 1/HRSG	5.49	44.20	349.667	347.3	14.690	630.000	316.768
Turbine 2/HRSG	5.49	44.20	349.667	347.3	14.690	0.000	0.000

Metcalf Energy Center
Modeled Impacts During Turbine Commissioning
Assume two turbines in commissioning
Revised 1/14/05

	Stack Diam, m	Stack Height, m	Exh Temp, Deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Emission Rates, g/s		
						NOx	CO 1-hr	CO 8-hr
Turbine 1/HRSG	5.49	44.20	349.667	347.3	14.690	24.016	315.000	158.384
Turbine 2/HRSG	5.49	44.20	349.667	347.3	14.690	24.016	315.000	158.384

Table 1 - Sutter Energy Center
Start-up Emissions Data

Nox emission rates during Start up

Plant	Turbine	Date	MEC permit Limit lb/hr	Emission rate lb/hr
Sutter	Unit 1	2/27/2004	80	117.4
Sutter	Unit 1	2/27/2004	80	116.6
Sutter	Unit 1	2/27/2004	80	116.5
Sutter	Unit 1	2/27/2004	80	113
Sutter	Unit 1	2/27/2004	80	116.5
Sutter	Unit 1	6/14/2004	80	94.3
Sutter	Unit 1	6/14/2004	80	106.5
Sutter	Unit 1	6/14/2004	80	90.6
Sutter	Unit 2	6/14/2004	80	104.9
Sutter	Unit 2	6/14/2004	80	106
Sutter	Unit 2	6/14/2004	80	104.7
Sutter	Unit 2	6/14/2004	80	104.5
Sutter	Unit 2	6/14/2004	80	103
Sutter	Unit 2	9/20/2004	80	111.5
		12/18/2004		104.1

CO emission rates during Start up

Plant		Date	MEC permit Limit lb/hr	Emission rate lb/hr
Sutter	Unit 1	2/27/2004	902	1211.5
Sutter	Unit 1	6/14/2004	902	1451.4

Table 2 - Sutter Energy Center
Shutdown Emissions Data

Nox emission rates during Shutdown

Plant	Turbine	Date	MEC permit Limit lb/hr	Emission rate lb/hr
	Unit 1	6/29/2004		26
Sutter	Unit 2	7/1/2004	18	23.9
Sutter	Unit 2	7/2/2004	18	25.3
		7/3/2004		24.8
Sutter	Unit 2	8/10/2004		25.6
	Unit 2	8/22/2004		25.6
	unit 1	9/30/2004		21.8
	Unit 2	10/1/2004		19.5
	Unit 1	12/17/2004		24.7